(4) $\dfrac{dx}{dt}=\dfrac{y}{x}\cdot\dfrac{dy}{dt}=\dfrac{30}{\sqrt{30^2-24^2}}\times 1=\frac{5}{3}$ ft. 1st answer.

(5) $\dfrac{d^2x}{dt^2}=\dfrac{x(dy/dt)(=\text{constant }1)-y(dx/dt)}{x^2}=\dfrac{x-(y^2/x)}{x^2}=\dfrac{x^2-y^2}{x^3}$

$$=-\frac{24^2}{x^3}=-\frac{24^2}{18^3}=-\tfrac{8}{81}\text{ acceleration per second.}$$

III. Results by J. SCHEFFER, A. M., Hagerstown, Md.

If I understand the problem correctly, I find the values to be $\frac{5}{3}$ and $\frac{8}{81}$ instead of $\frac{5}{6}$ and $\frac{12}{121}$.

[NOTE.—A letter from Dr. Byerly states that this, as a number of other errors, crept into the work by oversight. EDITOR.]

MECHANICS.

63. Proposed by A. H. BELL, Hillsboro, Ill.

From a horizontal support at a distance of 10 feet apart, a beam 5 feet long and 10 pounds weight is suspended by ropes attached to each end. The ropes are 3 and 5 feet respectively, in length. Required the angles made by the ropes and horizontal support. Also the stress upon each rope.

Comment by G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

Soon after my solution of the above problem was published Mr. George Richards and Mr. A. H. Bell called my attention to the incorrectness of my assumption in regard to the angles. The error was due to carelessness or inability on my part, either of which is inexcusable. Mr. A. H. Bell sent me the following admirable solution, and I doubt whether a simpler one can be effected. The fact that Mr. Bell has solved this problem is a sure guarantee of its correctness and accuracy.

Let $AB=c=10$, $AD=3=d$, $DC=g=5$, $BC=e=5$, $EB=x+y$, $AE=x-y$.

$$\cos E=\frac{(x+y)^2+(x-y)^2-c^2}{2(x+y)(x-y)}=\frac{(x+y-e)^2+(x-y-d)^2-g^2}{2(x+y-e)(x-y-d)}\ldots\ldots\ldots\ldots\ldots(1).$$

$$DF=CN=\frac{c^2+(x-y)^2-(x+y)^2}{2c(x-y)}(x-y-d)=\frac{c^2+(x+y)^2-(x-y)^2}{2c(x+y)}(x+y-e).(2).$$

$e+d=a=8$, $e-d=b=2$.

$$\therefore\ (1)=(4by+g^2-c^2-b^2)x^2-a(4y^2-c^2)x+(c^2+a^2-g^2)y^2-bc^2y$$

$$-\tfrac{1}{4}c^2(a^2-b^2)=0,\text{ or }x^2-\frac{32(y^2-25)}{8y-79}+\frac{139y^2-200y-1500}{8y-79}=0\ldots(3).$$

$(2)=x^3-\frac{1}{2}ax^2-[y^2-\frac{1}{2}by+(bc^2/8y)]x+\frac{1}{8}ac^2=0,$

$$\text{or } x^3-4x^2-[y^2-y+(25/y)]x+100=0\ldots\ldots(4).$$

Eliminating x between (3) and (4) we get,

$$128102400y^{12}-536601600y^{11}-9985725784y^{10}+36190002752y^9$$
$$+307839235264y^8-1004805985048y^7-4555231759005y^6$$
$$-4948451989304y^5+10854929220095 0y^4+26216813125200y^3$$
$$-545379844391 25y^2+268623315000y-49234858937500=0\ \ldots.(5).$$

The prodigious amount of work necessary to arrive at (5) is wonderful, and great credit is due Mr. Bell for the above solution.

DIOPHANTINE ANALYSIS.

72. Proposed by **H. C. WILKES**, Skull Run, W. Va.

Given $x^2+y^2+z^2=p^2+q^2+r^2$, to find unequal integral values for x, y, z, p, q, and r.

I. Solution by **M. A. GRUBER, A. M.**, War Department, Washington, D. C.

The conditions of the problem are satisfied in the following six identities, in which m, n and r represent any integers, the values being so chosen as to avoid *zero* in the residual quantities,

$$(m+n+r)^2+(m-r)^2+(n-r)^2=(m+n-r)^2+(m+r)^2+(n+r)^2,$$
$$(m+n+r)^2+(m-n)^2+(n-r)^2=(m-n+r)^2+(m+n)^2+(n+r)^2,$$
$$(m+n+r)^2+(m-n)^2+(m-r)^2=(m-n-r)^2+(m+n)^2+(m+r)^2,$$
$$(m+n-r)^2+(m-n)^2+(m+r)^2=(m-n+r)^2+(m+n)^2+(m-r)^2,$$
$$(m+n-r)^2+(m-n)^2+(n+r)^2=(m-n-r)^2+(m+n)^2+(n-r)^2,$$
$$(m-n+r)^2+(m-r)^2+(n+r)^2=(m-n-r)^2+(m+r)^2+(n-r)^2.$$

These equations can be reduced to the following two formulas :

$$\left(\frac{p+2q+2r}{3}\right)^2+\left(\frac{2p+q-2r}{3}\right)^2+\left(\frac{2p-2q+r}{3}\right)^2=p^2+q^2+r^2\ \ldots\ldots\ldots\ldots(1),$$

$$\left(\frac{2q-p+2r}{3}\right)^2+\left(\frac{2p+2q-r}{3}\right)^2+\left(\frac{2p-q+2r}{3}\right)^2=p^2+q^2+r^2\ \ldots\ldots\ldots\ldots(2).$$

To insure integral results, assign to p, q, and r multiples of 3.

As 3 things can be arranged in 6 different ways, there may be made, in regard to p, q, and r, 6 different substitutions with each set of assigned values.

In Formula (1), these substitutions will produce 3 different sets of values